

ZYZOMYS RACKHAMI SP. NOV. (RODENTIA, MURIDAE) A ROCKRAT FROM  
PLIOCENE RACKHAM'S ROOST SITE, RIVERSLEIGH,  
NORTHWESTERN QUEENSLAND

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Godthelp, H., 1997:06:30. *Zyzomys rackhami* sp. nov. (Rodentia, Muridae) a rockrat from Pliocene Rackham's Roost Site, Riversleigh, northwestern Queensland. *Memoirs of the Queensland Museum* 41(2): 329-333. Brisbane. ISSN 0079-8835.

*Zyzomys rackhami* sp. nov. from the Pliocene Rackham's Roost Site, Riversleigh, northwestern Queensland is the first fossil member of this genus and only the second Tertiary murid described from Australia. It is known from many hundreds of dental fragments recovered as a part of an ancient megadermatid roosting cave. It appears to be the most plesiomorphic member of the genus and is part of a diverse suite of extinct murids from this site. *M Rodentia, Muridae, Zyzomys, Pliocene, Riversleigh.*

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The murid genus *Zyzomys* contains 5 living species which are restricted to tropical Australia. *Zyzomys* has been placed in the tribe Conilurini (Baverstock, 1984) and is an 'Old Endemic' sensu Ride (1970) or an 'Older Immigrant' of Tate (1951). Along with *Mesembriomys* and *Conilurus*, *Zyzomys* comprises a group of taxa unified by a number of cranio-dental characters, phallic morphology (Lidicker, 1987) and chromosomes (Baverstock et al., 1981).

Dental nomenclature follows Musser (1981). Measurements are in millimetres. Unless otherwise stated material is housed in the Queensland Museum (QMF).

SYSTEMATICS

Order RODENTIA Bowdich, 1821  
Suborder MYOMORPHIA Brandt, 1855  
Infraorder MYODONTA Schaub, 1958  
Superfamily MUROIDEA Miller & Gidley,  
1918  
Family MURIDAE Gray, 1821  
Subfamily MURINAE Gray, 1821

*Zyzomys* Thomas, 1909

*Zyzomys rackhami* sp. nov.  
(Figs 1-2, Table 1)

MATERIAL. Holotype QMF10818, partial left maxillary with M<sup>1-3</sup>.

ETYMOLOGY. For Alan Rackham, the discoverer of the Rackham's Roost Site. Paratype QMF10819, left maxillary fragment with M<sup>1</sup> and zygomatic plate. Other material QMF23365, partial left maxillary with

M<sup>1-2</sup>; QMF10821, partial right maxillary with M<sup>1-3</sup>; QMF23325, partial right maxillary M<sup>1-3</sup>; QMF10819, left M<sup>1</sup>; QMF24001, partial left maxillary with M<sup>1-2</sup>; QMF24004, partial left maxillary with M<sup>1-2</sup>; QMF24002, right M<sup>1</sup>; QMF24003, right M<sup>1</sup>.

All from Rackham's Roost Site (19°02'09" S, 138°41'60" E) at Riversleigh, NW Queensland. The site represents the remnants of an ancient cave which has largely eroded away leaving the indurated floor sediments exposed. The sediments of the floor contain myriad bones and teeth, mostly fragmented, which are interpreted to be megadermatid (*Macroderma* and *Megaderma* spp.) prey remains (Godthelp, 1988; Hand, 1994). Its age is Pliocene on the basis of a macropodid similar to *Protemnodon snewini* Bartholamai (1978) which species occurs in the early to middle Pliocene Bluff Downs Local Fauna (Archer & Wade, 1976; Bartholamai, 1978).

DIAGNOSIS. *Zyzomys rackhami* differs from other species of the genus by the following combination of characters: Relatively well-developed series of cusps (T3,6,9) particularly T3, relatively small proportions of the lingual series of cusps (1,3,7), reduced molar gradient, frequent T1bis; tooth row short and narrow.

DESCRIPTION. Small to medium-sized dental arcade arcuate and concave lingually with the internal edge of M<sup>3</sup> as the most lingual point of the tooth row. M<sup>1</sup> longer than M<sup>2</sup>. M<sup>3</sup> small and relatively reduced. All cusps and cusp complexes with marked posteriorly inclined slant except in M<sup>3</sup> with cusps nearly vertical. Molar overlap minimal.

M<sup>1</sup>. Relatively long and narrow often with a prominent anterior cingulum which forms a semi-

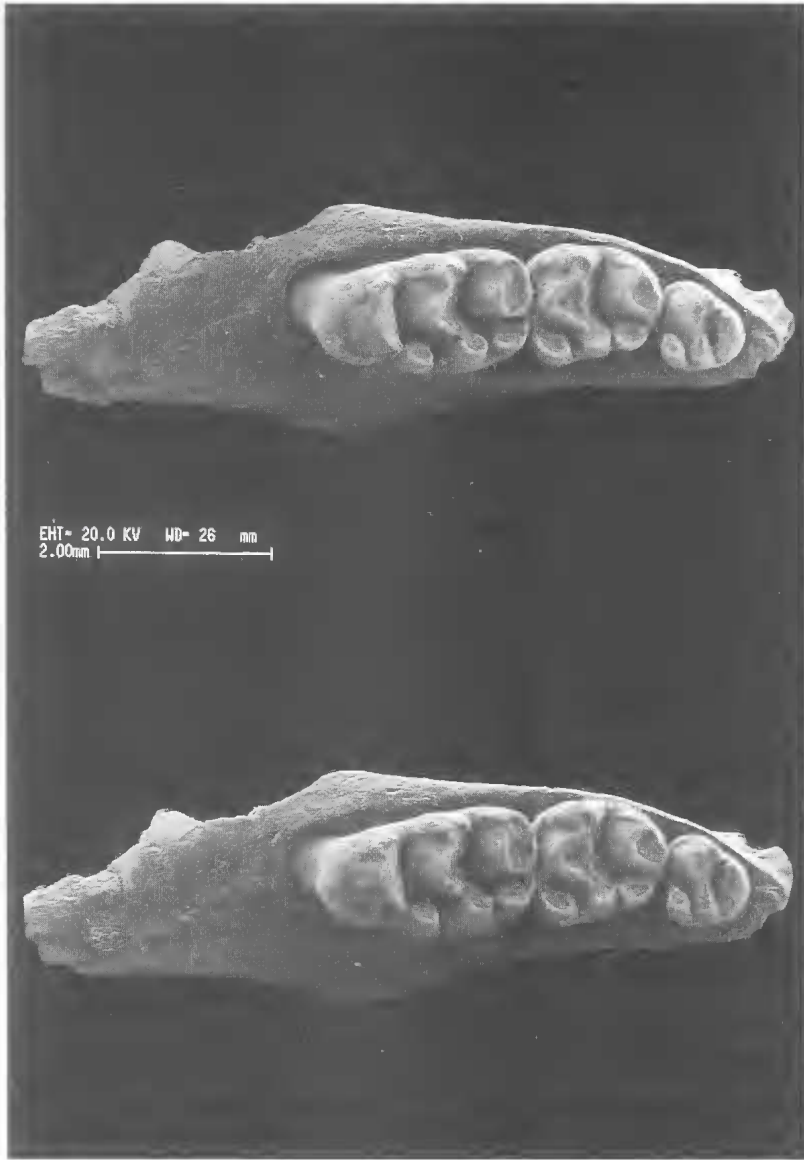


FIG. 1. *Zyzomys rackhami* sp. nov., Rackham's Roost Site, holotype, QMF10818, SEM (stereo pair).

circle around the T2,3 complex in the holotype. Anterior cingulum with a series of small but apparently occlusally functional accessory cusps randomly positioned. T1 elliptical with its long axis obliquely inclined to the axis of the T2,3 complex, directed to the rear of the tooth and positioned posterior to the base line of the T2,3 complex. T1 joined to the T2,3 complex only in extreme stages of wear and in some specimens via a variably sized and shaped T1bis.

T1bis with its long axis inclined obliquely to the axis of the T8,9 complex but in reverse to the angles of T1 and T4 and as such is directed forwards. T7 and T4 in very close proximity, forming a single complex after moderate to extreme wear. T8 large, with a nearly circular occlusal surface. T9 barely discernible, incorporated into the T8,9 complex at the onset of wear. Slight furrow in the anterior surface of the T8,9 complex marking the anterolingual edge of T9 (would remain even

structure in the holotype small, becoming more prominent with increased wear. T2 large and arcuate anteriorly with a straight posterior edge, more than half the width of the anterior portion of the tooth. T2 joined to T3 at its buccal edge. T3 small and circular, with its posterior third behind the posterior edge of T2, almost entirely incorporated into the T2 complex with wear. T4 elliptical with its long axis inclined obliquely to the axis of the T5,6 complex and directed posteriorly. T4 occlusal surface approximating T1 in size and shape if unworn, larger in worn specimens, joined to T5 in early stages of wear, nearly wholly incorporated in older individuals. T5 large, with a subangular arcuate anterior edge, with posteriorly concave posterior edge, with a smaller occlusal surface area than T2. T6 strongly attached to T5 even in early stages of wear, with junction of these two cusps marked by a cleft on the occlusal surface that continues anteriorly and ventrally as a furrow in the enamel indicating that the distinction between T5 and T6 is never lost. T6 circular, smaller than T3, approximately half of T6 behind the posterior edge of T5. T7 larger than T4, elliptical,



FIG. 2. *Zyzomys rackhami* sp. nov., paratype, QMF10821. SEM showing zygomatic plate.

with moderate wear). Posterior cingulum (*z*) absent.

**M<sup>2</sup>.** T1 large, tear-shaped, with a long axis obliquely inclined to the anterior edge of the tooth and directed posteriorly. T2 and T3 absent. T4 of moderate size, elliptical, posterior to the dominant T5. T4 joined to T5 in very early stages of wear. T5 subtriangular in occlusal outline, with its anterior most edge of the enamel boundary contacting the posterior edge of M<sup>1</sup> in extreme wear. T6 small, circular, joined to T5 with moderate wear. As in the T6 structure of M<sup>1</sup>, the connection associated with a well-defined furrow, this cusp always retaining its identity. T7 an elliptical cusp of moderate size, with its axis running almost parallel to the main axis of the tooth, not observed to merge with the T8,9 complex in M<sup>2</sup> even with extreme wear. T8 large, nearly circular, with distal edge extending well beyond the distal edge of T7, giving the posterior region of the tooth an areuate shape. T9 lost, with a remnant of the furrow that marked the position of the lingual side of the cusp.

**M<sup>3</sup>.** T1 small, almost circular. T2 and T3 absent. T4 small, tear-shaped, joined to T5 after

little wear, with an axis directed across the width of the tooth. T5 small, subtriangular, displaced toward the buccal edge of the tooth. T6 absent, with only a poorly defined remnant of the lingual furrow forming a weak buccal cingulum at the anterior edge. T7 moderate in size, shaped as a bisected semi-circle. T8 a mirror image of T7, with the 2 cusps joined in early wear. T9 absent.

**M<sup>1</sup>** with 4 roots, 3 well-developed, fourth small and probably reduced; anterior root large, directed forwards, exposed occlusally; medio-lingual root long, narrow, positioned under T1 and the anterior edge of T4; medio-buccal root a remnant of a more substantial root, with an alveolus for this root on all specimens examined even though there is not always a root. Posterior root large, nearly as wide as the tooth at its origin, directed towards the buccal edge of the maxillary. **M<sup>2</sup>** with 3 roots; anterolingual and anterobuccal roots of equal size, together below the anterior margin of the tooth; posterior root wide, running obliquely with respect to the anterior roots, with lingual extremity its most posterior point. **M<sup>3</sup>** with 3 roots of equal size, forming a triangle with a root at each apex. As in M<sup>2</sup> there are 2 anterior roots (buccal and lingual).

Occlusal surface of the tooth row concave, with the highest points being the anterior third of M<sup>1</sup> and the M<sup>3</sup>. Anterior palatal vacuity extending distally as far the anterior edge of M<sup>1</sup>. Attachment node for the origin of the superficial masseter large and well defined. Anterior edge of the node aligned with the anterior edge of the zygomatic plate and just behind the maxillary/premaxillary suture. Zygomatic with anterior edge rising vertically and straight, of moderate width, with one nutrient foramen distally near its base.

**COMPARISON.** Although the nearest species in size *Z. argurus*, *Z. rackhami* is more similar to *Z. pedunculatus* because of the relatively cuspidate nature of the teeth, the development of the buccal series of cusps and the relatively unreduced appearance of M<sup>3</sup>. These similarities are probably simplesiomorphies. A nutrient foramen is found anterior to the tooth row in all species with the exception of *Z. rackhami* and *Z. maini*, in which the foramen is on the zygomatic plate. Unlike *Z. maini* however *Z. rackhami* has a longitudinal palatal crest as in all other species of *Zyzomys*.

*Zyzomys rackhami* differs from *Pseudomys*,

TABLE 1. Measurements (mm) of *Zyzomys rackhami* sp. nov. L=length; W=width.

SPEC. NO.	M <sup>1-3</sup> L	M <sup>1-2</sup> L	M <sup>1</sup>	
			L	W
QMF10818	5.3	4.3	2.6	1.5
QMF10821	5.6	4.4	2.7	1.6
QMF23325	5.3	4.3	2.7	1.7
QMF10819	-	-	2.7	1.7
QMF23365	-	4.2	2.6	1.5
QMF24001	-	4.3	2.6	1.6
QMF24002	-	-	2.5	1.5
QMF24003	-	-	2.7	1.5
QMF24004	-	4.2	2.6	1.5
QMF30065	-	4.2	2.6	1.5
QMF30063	-	4.2	2.6	1.5
QMF30062	-	-	2.6	1.5
QMF24503	-	4.2	2.6	1.5
QMF10810	-	-	2.7	1.6
QMF30268	-	4.3	2.6	1.5
QMF30265	-	4.3	2.6	1.5

*Mastacomys*, *Leporillus*, *Notomys*, *Leggadina*, *Rattus*, *Melomys* and *Uromys* in having a well-developed T7. *Z. rackhami* is distinguished from *Pogonomys* by the lack of a posterior cingulum (z) and by smaller and less pronounced buccal cusps (T3,6,9). *Z. rackhami* differs from *Hydromys* and *Xeromys* in having 3 upper molars. *Z. rackhami* differs from *Conilurus* in having a well-developed T3 and T1 isolated from and distal to the T2,3 complex. *Z. rackhami* is removed from *Mesembriomys* by retaining a T9 on M<sup>1</sup>, close proximity of T7 to the T8.9 complex, reduced molar overlap and less cuspidate nature of the molars.

**DISCUSSION.** *Zyzomys rackhami* is the most abundant (mainly isolated molars) rodent in the Rackham's Roost deposit but only a few maxillary fragments are known. Skulls apparently break up more readily than other murids from the deposit.

Lower jaws of rodents are uncommon in the deposit and not well preserved. No elements of the lower dentition of *Z. rackhami* have been identified. There is apparently some taphonomic process limiting the number of dentaries preserved. This might be caused by some aspect of the feeding behaviour of *Macroderma gigas*, the presumed predator, or by some physical process of sorting within the original cave system. In the latter case it is possible that we might find a

concentration of these elements elsewhere in the deposit. Lower jaws and teeth of other mammal groups (i.e., marsupials, bats) found in the deposit appear to be as abundant as their upper counterparts.

*Z. rackhami* is the only species of *Zyzomys* recovered from the Rackham's Roost Local Fauna and is represented by hundreds of specimens. This is in contrast to modern and Pleistocene faunas, in which there are usually at least 2 species present and sometimes, as in the Nouralangie Rock area, N.T., 3 (Kitchener (1989) reported only 2 but the author has sighted 2 specimens of *Z. woodwardi*, CM7200 and CM7200, from the area.) Areas on the east coast where only *Z. argurus* is now found appear to have lost a second species, *Z. woodwardi*, only recently, as is the case in the Chillagoe area. *Z. pedunculatus* occurs in surficial cave deposits at Cape Range, Western Australia along with *Z. argurus* which is still extant locally. In the Riversleigh area *Z. argurus* has been trapped and *Z. woodwardi* has been recovered from Recent owl pellet deposits along the Gregory River. Both *Z. argurus* and *Z. woodwardi* have been recovered from *Macroderma gigas* prey remains in Carrington's Cave on Riversleigh Station. The deposits in Carrington's Cave are as yet undated but appear to range from Recent to Pleistocene. The presence of both species in these deposits indicates that *M. gigas* is capable of taking the relatively larger *Z. woodwardi* as prey. Pliocene *M. gigas* from Rackham's Roost were not different in size (Hand, 1994) from the modern population and prey size would seem to be an unlikely explanation for the absence of a second *Zyzomys* in the Rackham's Roost deposit.

#### ACKNOWLEDGEMENTS

Work at Riversleigh has been supported by the Australian Research Council, the Department of the Environment, Sport and Tourism, National Estate Programme Grants (Queensland), the Australian Geographic Society, ICI, the Queensland Museum and the University of NSW. Access to comparative material was kindly provided by S. Van Dyck, J. Calaby, T. Flannery, L. Gibson, D. Kitchener and P. Jenkins. SEM photographs were taken by J. Muirhead at the University of NSW. I am grateful to A. Gillespie and S. Williams who have done much of the preparation of the material. Particular thanks are due to the Rackham family for their unwavering enthusiasm and assistance throughout the past years. I must thank

my colleagues M. Archer and S. Hand for their support and advice, and B. Turnbull and A. Baynes for constructive criticism of earlier drafts of this manuscript.

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